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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/628,330 | 07/29/2003 | Satoshi Miura | 03131 | 6093 |

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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT PAPER NUMBER

3745

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--|-------------------------------------|--|
| Office Action Summary | Application No. 10/628,330 | Applicant(s) MIURA ET AL. | |
| | Examiner Christopher Verdier | Art Unit 3745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11-5-03, 7-28-05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 7-9 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 10-17, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>7-29-03</u> . | 6) <input type="checkbox"/> Other: _____ |

Election/Restrictions

Applicant's election without traverse of Species I, figures 1-13 in the reply filed on July 28, 2005 is acknowledged.

Claims 7-9 and 18-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Receipt and entry of Applicants' Preliminary Amendment dated November 5, 2003 is acknowledged.

Drawings

The drawings are objected to because in figure 18, "FREQUENCY" should be changed to - FREQUENCY -. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after

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the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The disclosure is objected to because of the following informalities: appropriate correction is required.

In paragraph 6, line 3, "161a" should be changed to -- 151 a --.

In paragraph 11, line 4, "be" should be deleted.

In paragraph 11, line 4, "canceled" should be changed to -- cancel --.

In paragraph 55, last line, -- an -- should be inserted after "as".

Claim Objections

Claims 2-6, 10-12, 14-17, and 21-22 are objected to because of the following informalities: Appropriate correction is required.

In claim 2, line 14, "fist" should be changed to -- first --.

In claim 6, line 1, "claims" should be changed to -- claim --.

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In claim 10, line 3, "disposed at least one of the terminal ends" is non-idiomatic.

In claim 14, line 15, "fist" should be changed to -- first --.

In claim 14, line 22, "." should be deleted.

In claim 15, line 6, "communicates" should be changed to -- communicating --.

In claim 21, line 1, "claims" should be changed to -- claim --.

In claim 21, line 3, "disposed at least one of the terminal ends" is non-idiomatic.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1-4, 6, 10-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art Figures 23-24 in view of Sakamoto 6,443,692 and Fuji 6,336,788. Applicants' Admitted Prior Art Figures 23-24 (AAPA Figures 23-24) discloses an impeller pump for a fluid substantially as claimed, including a rotary impeller 110, a pump casing 104 defining a first pump channel 151 and a second pump channel 171, wherein the rotary impeller is disposed within the pump casing and opposes to the first pump channel and the second pump channel, respectively, a convergence device (the unnumbered channel within which the impeller rotates) arranged and constructed to converge the fluid discharged from the first pump channel and the fluid discharged from the second pump channel, with the rotary impeller having a first surface and a second surface opposing to each other, each of the first and second surfaces includes a plurality of grooves 112 arranged in a circumferential direction of the impeller and spaced from each other by a predetermined pitch, with the first pump channel opposing the grooves of the first surface of the impeller, the first pump channel communicating with a first suction port 152 and a first discharge port 153, and the first suction port and the first discharge port are separated from each other by a first partition wall 105a, the second pump channel opposes the grooves of the second surface of the impeller, the second pump channel communicating with a second suction port 172 and a second discharge port 173, and the second suction port and the second discharge port are separated from each other by a second partition wall 107a, the convergence device comprising a convergence channel communicating with the first discharge port and the second discharge port, so that the fluid discharged from the first discharge port and the fluid discharged from the second discharge port converge at the convergence channel. The first discharge port and the second discharge port are disposed at the

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same position in the circumferential direction of the impeller. The first pump channel and the second pump channel include unnumbered terminal ends that communicate with the first discharge port and the second discharge port, respectively, and an unnumbered motor section that rotates the impeller.

However, AAPA Figures 23-24 does not disclose a pulsation canceling device arranged and constructed to cancel pulsations of the fluid discharged from the first pump channel and the second pump channel, respectively (claim 1), does not disclose an impact reducing device arranged and constructed to reduce impacts produced by at least one of the flow of the fluid from the first pump channel and the flow of the fluid from the second channel (claim 1), does not disclose the pulsation canceling device being arranged and constructed to cancel pulsations of the fluid discharged from the first discharge port and the second discharge port (claim 2), does not disclose the impact reducing device is arranged and constructed to reduce impacts of the fluid caused by change of direction of at least one of a flow of the fluid discharged from the first pump channel toward the first discharge port and a flow of the fluid discharged from the second pump channel toward the second discharge port (claim 2), does not disclose that the pulsation canceling device is arranged and constructed to shift a phase of the pulsation of the fluid discharged from the first discharge port from a phase of the pulsation of the flow of the fluid discharged from the second discharge port (claim 3), does not disclose that the pulsation canceling device is arranged and constructed to displace the grooves of the impeller defined in the first surface from the grooves defined in the second surface by a half the predetermined pitch (claim 4), does not disclose that each of the terminal ends has a part opposing to the grooves

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defined in the corresponding one of the first and second surfaces of the impeller such that the impact reducing device is arranged and constructed to gradually reduce a sectional area of the part of the terminal end in the rotational direction of the impeller (claim 6), does not disclose that the impact reducing device comprises a depth decreasing region disposed at one of the terminal ends of the first and second pump channels, with the depth decreasing region configured to gradually reduce the depth of the part of at least one of the terminal ends in the rotational direction (claim 10), and does not disclose that the depth decreasing region comprises an inclined surface opposing to the grooves defined in the corresponding ones of the first and second surfaces of the impeller, with the inclined surface being inclined in the rotational direction of the impeller (claim 11).

Sakamoto (figures 1-8) shows a regenerative channel pump having a pulsation canceling device arranged and constructed to cancel pulsations of fluid discharged from a first bottom pump channel near 6 and a second top pump channel near 6, with the pulsation canceling device being arranged and constructed to cancel pulsations of the fluid discharged from a first discharge port 34, with the pulsation canceling device being arranged and constructed to displace grooves 12 of the impeller defined in a first surface from grooves 12 defined in a second surface of the impeller by a half a predetermined pitch, for the purpose of reducing pulsations and noise.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the impeller of AAPA Figures 23-24 such that the grooves of the impeller defined in the first surface are offset from the grooves defined in the second surface of

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the impeller by a half the predetermined pitch, as taught by Sakamoto, for the purpose of reducing pulsations and noise. This modification would inherently result in the cancellation of pulsations of the fluid discharged from the first discharge port and the second discharge port, and the shifting of a phase of the pulsation of the fluid discharged from the first discharge port from a phase of the pulsation of the flow of the fluid discharged from the second discharge port.

Fuji '788 (figures 1-7) shows a regenerative channel pump having an impact reducing device 24f arranged and constructed to reduce impacts produced by flow of the fluid from a first pump channel 21 with the impact reducing device being arranged and constructed to reduce impacts of the fluid caused by change of direction of a flow of the fluid discharged from the first pump channel toward a first discharge port 24, with an unnumbered terminal end having the part 24 opposing to grooves 16a defined in the corresponding one of first and second surfaces of the impeller 16 such that the impact reducing device is arranged and constructed to gradually reduce a sectional area of the part of the terminal end in the rotational direction of the impeller, with the impact reducing device comprising a depth decreasing region disposed at one of the terminal ends of the first pump channels, with the depth decreasing region configured to gradually reduce the depth of the part of at least one of the terminal ends in the rotational direction, with the depth decreasing region comprising an inclined surface opposing to the grooves defined in the impeller, with the inclined surface being inclined in the rotational direction of the impeller, for the purpose of allowing fluid to be smoothly discharged from the discharge port, reducing the amount of fluid that collides with the terminal end of the discharge port and reducing noise.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified impeller of AAPA Figures 23-24 such that it includes an impact reducing device of the form taught by Fuji, for the purpose of allowing fluid to be smoothly discharged from the discharge port, reducing the amount of fluid that collides with the terminal end of the discharge port and reducing noise. With regard to claim 6, which recites that each of the first discharge port and second discharge port have the impact reducing device in the form of the part opposing the groove in the first and second surfaces of the impeller, and claim 11, which recites that the depth decreasing region is an inclined surface opposing to the grooves defined in the first and second surfaces of the impeller, these are duplications of a known part for a known function. It would have been further obvious to provide the impact reducing device of Fuji on both the first and second discharge port of AAPA Figures 23-24, for the purpose of reducing the amount of fluid that collides with the terminal ends of both discharge ports and reducing noise, since it has been held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art Figures 23-24 and Sakamoto 6,443,692 and Fuji 6,336,788 as applied to claim 2 above, and further in view of Rollwage 6,527,507. The modified impeller pump of AAPA Figures 23-24 shows all of the claimed subject matter except for a communication hole defined in the impeller that communicates between a pair of grooves defined in the first and second surface, and opposing to each other in the axial direction.

Rollwage (figures 1-3) shows a regenerative channel pump having a pump casing and an impeller 18 with communication holes 36 defined in the impeller that communicate between a pair of grooves 22 defined in a first and second surface of the impeller, and opposing to each other in the axial direction, for the purpose of providing a low or small force in the direction of the rotary axis with which the impeller is pressed against a sidewall of the casing.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified impeller of AAPA Figures 23-24 such that the impeller includes a communication hole defined in the impeller that communicates between the pair of grooves defined in the first and second surfaces, and opposing to each other in the axial direction, as taught by Rollwage, for the purpose of providing a low or small force in the direction of the rotary axis with which the impeller is pressed against a sidewall of the pump casing.

Claims 14-16 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art Figures 23-24 and Sakamoto 6,443,692 and Fuji 6,336,788 and Rollwage 6,527,507. The rejection of claim 14 corresponds to the same grounds of rejection as applied to claim 12 above, and reference is made to the rejection of claim 12, above. The rejection of claims 15, 16, 21, and 22 corresponds to the same grounds of rejection applied to claims 6, 4, 10, and 11, respectively, set forth above.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 and 13 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable both over claim 1 of U.S. Patent No. 6,733,230 in view of Fuji 6,336,788. Claim 1 of U.S. Patent 6,733,230 claims substantially the same subject matter as claims 1 and 13 of the instant application, including a rotary impeller, a pump casing defining first and second pump channels (chambers), a converging channel coupled to the first and second pump channels (which inherently will converge fluid discharged from the first pump channel and the second pump channel because the converging channel is coupled to the first and second pump channels), and a pulsation canceling device that cancels pulsations of the fluid discharged from the first and second pump channels.

However, claim 1 of U.S. Patent 6,733,230 does not claim an impact reducing device arranged and constructed to reduce impacts produced by at least one of the flow of the fluid from

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the first pump channel and the flow of the fluid from the second channel, and does not claim a motor section arranged and constructed to rotate the impeller.

Fuji '788 (figures 1-7) shows a regenerative channel pump having an impact reducing device 24f arranged and constructed to reduce impacts produced by flow of the fluid from a first pump channel 21 with the impact reducing device being arranged and constructed to reduce impacts of the fluid caused by change of direction of a flow of the fluid discharged from the first pump channel toward a first discharge port 24, with an unnumbered terminal end having the part 24 opposing to grooves 16a defined in the corresponding one of first and second surfaces of the impeller 16 such that the impact reducing device is arranged and constructed to gradually reduce a sectional area of the part of the terminal end in the rotational direction of the impeller, with the impact reducing device comprising a depth decreasing region disposed at one of the terminal end of the first pump channels, with the depth decreasing region configured to gradually reduce the depth of the part of at least one of the terminal ends in the rotational direction, with the depth decreasing region comprising an inclined surface opposing to the grooves defined in the impeller, with the inclined surface being inclined in the rotational direction of the impeller, for the purpose of allowing fluid to be smoothly discharged from the discharge port, reducing the amount of fluid that collides with the terminal end of the discharge port and reducing noise. A motor section 6 is arranged and constructed to rotate the impeller, for the purpose of providing power to the impeller.

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the impeller of claim 1 of U.S. Patent 6,733,230 such that it includes an impact reducing device of the form taught by Fuji, for the purpose of allowing fluid to be smoothly discharged from the discharge port, reducing the amount of fluid that collides with the terminal end of the discharge port and reducing noise, and to provide the impeller with a motor section arranged and constructed to rotate the impeller, as taught by Fuji, for the purpose of providing power to the impeller.

Claims 2, 3, 5, 6, 10, and 11 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 18, 18, 19, 18, 18, and 18, respectively, of U.S. Patent No. 6,733,230 and Fuji 6,336,788 as applied to claim 1 above, and further in view of Applicants' Admitted Prior Art Figures 23-24. The modified impeller pump of claims 18 and 19 claims substantially the same subject matter as claims 2, 3, 5, 6, 10, and 11 of the instant application, including the rotary impeller having first and second opposing surfaces with grooves spaced apart from each other by a predetermined pitch, a first suction port, a first discharge port, a second suction port, and a second discharge port, but does not claim that that the first suction port and discharge port are separated from each other by a first partition wall, does not claim that that the second suction port and discharge port are separated from each other by a second partition wall, and does not claim the convergence device communicating with the first discharge port and the second discharge port.

Applicants' Admitted Prior Art Figures 23-24 shows a regenerative channel pump having a first suction port 152 and a first discharge port 153 that are separated from each other by a first partition wall 105a, with a second suction port 172 and a second discharge port 173 that are separated from each other by a second partition wall 107a, with an unnumbered convergence device in the form of a channel communicating with the first discharge port and the second discharge port, for the purpose of obtaining increased pressure from the regenerative pump.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified impeller of claim 18 of U.S. Patent 6,733,230 such that the first suction port and discharge port are separated from each other by a first partition wall, such that the second suction port and discharge port are separated from each other by a second partition wall, and such that the convergence device communicates with the first discharge port and the second discharge port, as taught by AAPA Figures 23-24.

Claim 4 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 18 of U.S. Patent No. 6,733,230 and Fuji 6,336,788 and Applicants' Admitted Prior Art Figures 23-24 as applied to claim 3 above, and further in view of Sakamoto 6,443,692. The modified impeller pump of claim 18 claims substantially the same subject matter as claim 4 of the instant application, but does not claim that the pulsation canceling device is arranged and constructed to displace the grooves of the impeller defined in the first surface from the grooves defined in the second surface by a half the predetermined pitch.

Sakamoto (figures 1-8) shows a regenerative channel pump having a pulsation canceling device arranged and constructed to cancel pulsations of fluid discharged from a first bottom pump channel near 6 and a second top pump channel near 6, with the pulsation canceling device being arranged and constructed to cancel pulsations of the fluid discharged from a first discharge port 34, with the pulsation canceling device being arranged and constructed to displace grooves 12 of the impeller defined in a first surface from grooves 12 defined in a second surface of the impeller by a half a predetermined pitch, for the purpose of reducing pulsations and noise.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified impeller of claim 18 of U.S. Patent 6,733,230 such that the pulsation canceling device is arranged and constructed to displace the grooves of the impeller defined in the first surface from the grooves defined in the second surface by a half the predetermined pitch, as taught by Sakamoto.

Claim 12 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 18 of U.S. Patent No. 6,733,230 and Fuji 6,336,788 and Applicants' Admitted Prior Art Figures 23-24 as applied to claim 2 above, and further in view of Rollwage 6,527,507. The modified impeller pump of claim 18 claims substantially the same subject matter as claim 12 of the instant application, but does not claim a communication hole defined in the impeller that communicates between a pair of grooves defined in the first and second surface, and opposing to each other in the axial direction.

Rollwage (figures 1-3) shows a regenerative channel pump having a pump casing and an impeller 18 with communication holes 36 defined in the impeller that communicate between a pair of grooves 22 defined in a first and second surface of the impeller, and opposing to each other in the axial direction, for the purpose of providing a low or small force in the direction of the rotary axis with which the impeller is pressed against a sidewall of the casing.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified impeller of claim 18 of U.S. Patent 6,733,230 such that the impeller includes a communication hole defined in the impeller that communicates between the pair of grooves defined in the first and second surfaces, and opposing to each other in the axial direction, as taught by Rollwage.

Claims 14, 15, 17, 21, and 22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable all over claim 18 of U.S. Patent No. 6,733,230 in view of Fuji 6,443,692 and Applicants' Admitted Prior Art Figures 23-24 and Rollwage 6,527,507. The rejection of claim 14 corresponds to the same obviousness-type double patenting grounds of rejection as applied to claim 12 immediately above, and reference is made to the rejection of claim 12, above. The rejection of claims 15, 17, 21, and 22 corresponds to the same grounds of rejection applied to claims 6, 5, 10, and 11, respectively, set forth above.

Claim 16 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 19 of U.S. Patent No. 6,733,230 and Fuji 6,336,788

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and Applicants' Admitted Prior Art Figures 23-24 and Rollwage 6,527,507 as applied to claim 15 above, and further in view of Sakamoto 6,443,692. The modified impeller pump of claim 19 claims substantially the same subject matter as claim 16 of the instant application, including the first and second discharge ports being disposed at the same position in the circumferential direction, but does not claim that the pulsation canceling device is arranged and constructed to displace the grooves of the impeller defined in the first surface from the grooves defined in the second surface by a half the predetermined pitch.

Sakamoto (figures 1-8) shows a regenerative channel pump having a pulsation canceling device arranged and constructed to cancel pulsations of fluid discharged from a first bottom pump channel near 6 and a second top pump channel near 6, with the pulsation canceling device being arranged and constructed to cancel pulsations of the fluid discharged from a first discharge port 34, with the pulsation canceling device being arranged and constructed to displace grooves 12 of the impeller defined in a first surface from grooves 12 defined in a second surface of the impeller by a half a predetermined pitch, for the purpose of reducing pulsations and noise.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified impeller of claim 19 of U.S. Patent 6,733,230 such that the grooves of the impeller defined in the first surface are offset from the grooves defined in the second surface of the impeller by a half the predetermined pitch, as taught by Sakamoto, for the purpose of reducing pulsations and noise.

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Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nishikawa is cited to show a regenerative impeller with impeller grooves on an upper surface offset from impeller grooves on a lower surface.

Fuji '713 and Murase are cited to show regenerative impellers with communication grooves.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
October 6, 2005



Christopher Verdier
Primary Examiner
Art Unit 3745